

REMARKS

The Office Action dated July 9, 2004 and references cited therein have been carefully reviewed. In an effort to place the above-identified patent application in allowable form, Applicants have, by this amendment, amended claims 64-96.

OVERVIEW OF THE INVENTION

The present invention is particularly directed to a roofing and/or siding system that has a high resulting reflectivity. The high reflectivity of the roofing and/or siding system provides several benefits to the roofing system such as reducing the temperature of the surface of the roofing and/or siding system, reducing the amount of energy required to maintain the structure adjacent the roofing and/or siding system, reducing the contribution of the roofing and/or siding system as an urban heat island, increasing the life of the roofing and/or siding system, etc.

The granules used on of the roofing and/or siding system are generally white colored and are partially embedded in the roofing and/or siding material of the roofing and/or siding system. The granules also have physical properties and compositions that enhance the life of the roofing and/or siding system and increase the resulting reflectivity of the roofing and/or siding system.

The roofing and/or siding system can include multiple coatings of different sized granules to improve the coverage percentage of the roofing and/or siding materials and increase the resulting reflectivity of the roofing and/or siding system.

THE SECTION 103 REJECTIONS

Claims 64-83 and 94-97 were rejected under 35 U.S.C. §103(a) as being unpatentable over Harshberger 2,202,002 in view of Harshberger 2,131,044. Claims 84-93 were rejected under 35 U.S.C. §103(a) as being unpatentable over Harshberger 2,202,002 in view of Harshberger 2,131,044 and further in view of McArdle 2002/0066233. Applicants submit that the amended claims are patentable over the cited art of record.

**A. Claims 64-83 and 94-97 Are Not Obvious
In View of the Two Harshberger References**

Independent claims 64, 74 and 94 have been amended to require that the granules used in the roofing or siding system be non-coated granules that have a generally white color. The independent claims also include limitations concerning the coating coverage of the non-coated granules on the surface of roofing or siding material, and the physical property parameters of the non-coated granules. The limitations in these independent claims are not disclosed, taught or suggested by the two Harshberger references.

1. Harshberger '002

Harshberger '002 discloses the use of artificially colored granules on various surfaces such as a roofing surface. The granules are coated with a material that includes a color pigment to form color coated granules. (Page 2, Col. 1, lines 9-63). The process for coating the granules and materials used to coat the granules are disclosed on pages 2-4 of Harshberger '002.

Harshberger '002 also discloses that the coated granules are formed from a porous particle that can bind with a coating material. The porous core particle is described as a slag material having a similar composition to cement. The composition of the core is disclosed to include less than 60% aluminum oxide, silicon oxide and iron oxide, and 20-50 percent calcium oxide and magnesium oxide. (Page 2, Col. 2, lines 6-55). The coating material is described as a cement coating that includes less than 50 weight percent aluminum oxide and silicon oxide. (Page 3, Col. 2, lines 25-37).

2. Harshberger '044

Harshberger '044 discloses a process of making a rolled roofing material. (Page 1, Col. 2, lines 1-58). The roofing material disclosed includes a flexible base composition 2 that is coated with a material 6 such as mineral particles, crushed brick, gravel, crushed slag, pebbles, crushed slate, coke, crushed glass or granulated petrified materials. (Page 2, Col. 1, lines 46-49). After these

particles 6 are applied to the flexible base composition 2, a cement coating 8 is applied to the roofing material, thereby encapsulating these particles 6 between the flexible base composition 2 and the cement layer 8 as shown in Figures 3-5.

Harshberger '044 also discloses that an additional layer of mineral particles 18 having a color that contrasts to cement layer 8 can be embedded in desired areas on the roofing material. (Page 3, Col. 2, lines 35-40).

3. Independent Claims 64, 74 and 94

Independent claims 64, 74 and 94 were amended to include the limitation that the granules used on the roofing or siding system are non-coated granules that have a generally white color. These granules are distinguished from the granules disclosed in the two Harshberger references.

The non-coated generally white granules used to form the highly reflective roofing or siding system are distinguished from the coated granules disclosed in Harshberger '002.

Independent claims 64, 74 and 94 also include limitations concerning the coating coverage of the non-coated granules on the surface of roofing or siding material, and the physical property parameters of the non-coated granules.

Harshberger '002 is absent teachings concerning a coating coverage of over about 95% by the non-coated granules on the surface of roofing or siding material. Indeed, Harshberger '002 does not include any teachings concerning a coating coverage of the coated granules on a roofing material. The Examiner acknowledges this deficiency of Harshberger '002 and relied on Harshberger '044 to overcome this deficiency.

Harshberger '044, like Harshberger '002, is absent any teachings concerning the coverage percentage of the granules on the top surface of the roofing material. Figures 3-5 of Harshberger '044 disclose that the granules are not on the top surface of the roofing material, but embedded under a layer of cement 8. Figure 6 of Harshberger '044 discloses a mineral layer 18 can be applied to the

top of the cement layer 8; however, the coverage percentage of this layer is not disclosed. It appears from Figure 6 that the coverage percentage of mineral layer 18 is about 50%. The Examiner's assertions that Harshberger '044 discloses granules that are applied to a top surface of a roofing material to achieve a coverage percentage of over 95% is not supported by the teachings of Harshberger '044. Indeed, one of ordinary skill in the art upon viewing the low density of granules on the roofing surface as illustrated in Figure 6 would likely conclude that a high percentage of coverage by the surface granules is not required.

Independent claim 64 further requires the non-coated granules to include at least about 80 weight percent aluminum oxide and silicon oxide and have an average porosity of 0-15%. Independent claim 74 further requires the non-coated granules to include silicon dioxide and at least about 94 weight percent aluminum oxide and have an average porosity of 0-15%. Independent claim 94 further requires the non-coated granules to include at least about 74 weight percent aluminum oxide and silicon oxide and have an average porosity of less than 20%. The composition of the granules defined in these claims is not disclosed in Harshberger '002 or Harshberger '044.

Harshberger '044 is absent any teachings concerning the physical properties of particles 6 or 18. Furthermore, the non-coated granules defined in claims 64, 74 and 94 are contrary to the teachings of Harshberger '002 with respect to composition and porosity. Harshberger '002 teaches the used of "coated" granules. These "coated" granules include a material having a "high" porosity so that the core will bind with the cement coating. Such a teaching is contrary to the properties of the granules defined in the claims. The composition of the core and cement coating as disclosed in Harshberger '002 also is such that the combination of the cement coating and porous core particle cannot result in an aluminum oxide and silicon oxide content of over 60 weight percent.

The resulting porosity of the coating cement is further absent from the teachings of Harshberger '002, as is the resulting average reflectivity, opacity and Moh's hardness of the coated

granule.

The Examiner's conclusions concerning what the two Harshberger references could or might disclose to one skilled in the art with respect to the composition of the granules, the porosity of the granules, the reflectivity of the granules, the hardness of the granules and/or the opacity of the granules appears to be based in part on hindsight reconstruction of the pending claims and Applicants' disclosed invention. Applicants are unaware of any roof manufacturer that offers or sells a product that is defined in the pending claims. A current demand has existed for many years to develop energy efficient roofing systems. Many strategies have been developed and marketed to achieve this long felt need. The possibilities and speculation by the Examiner as to the type of granules that could be used on a roofing or siding system based on the teachings of the two Harshberger references cannot properly form the basis of a rejection of the pending claims. The fact that Applicants' roofing system has not been publically available in view of the cited teachings concerning roofing systems dating at least as early as the 1930's is further evidence that the roofing and siding system defined in the pending claims is not obvious in view of the cited art of record.

In view of the teachings of Harshberger '002 and Harshberger '044 as discussed above, independent claims 64, 75 and 94 and all the claims dependent therefrom are allowable over these two references.

4. Patentably Distinct Dependent Claims

Several of the claims that depend on independent claims 64, 74 and 94 also include limitations that are not disclosed, taught or suggested by the two Harshberger references.

Claims 65, 75 and 95 require that at least two different sized non-coated granules be partially embedded in the top surface of the roof or siding system. These claims also require that the size ratio of a first sized non-coated granule to a second sized non-coated granule be at least about 1.3:1. The Examiner acknowledges the deficiency of Harshberger '002 with respect to the use of two

different sized granules and relied on Harshberger '044 to overcome this deficiency. The Examiner cited Page 2, Col. 1, lines 38-46 and Col. 2, line 17 of Harshberger '044 as teaching the use of two different sized granules on the top surface of a roofing material. The text of Harshberger '044 referred to by the Examiner discusses the application of material 6 on adhesive coating 4 prior to covering material 6 with a cement material 8 as illustrated in Figures 3-5. A discussion of the use of two different sized particles is absent from this text. Indeed, this portion of the text does not even discuss the application of granules for use on a top surface of the roofing material. Applicants submit that the two Harshberger references do not make obvious dependent claims 65, 75 and 95.

Dependent claims 70, 71, 80, 81 and 96 require the non-coated granules cover over 98% of the top surface of the adhering material. Harshberger '002 is absent any teachings concerning a coating coverage as acknowledged by the Examiner. Harshberger '044, as discussed above, is also absent any teachings concerning the coverage percentage of the granules on the top surface of the roofing material. Figures 3-5 of Harshberger '044 disclose that the granules are embedded under a layer of cement 8. Figure 6 of Harshberger '044 discloses a mineral layer 18 sporadically applied to the top of the cement layer 8. Applicants submit that the two Harshberger references do not make obvious dependent claims 70, 71, 80, 81 and 96.

Dependent claims 66-69 and 76-79 defined a particular non-coated granule composition that is used on the roof or siding system. These compositions are not disclosed or suggested in the two Harshberger references. Indeed, Harshberger '002 teaches away from the composition of the non-coated granules defined in 66-69 and 76-79. Applicants submit that the two Harshberger references do not make obvious dependent claims 66-69 and 76-79.

B. Claims 84-93 Are Not Obvious In View of the Two Harshberger References And McArdle

Independent claim 84 was amended to included the limitation that the granules used on the

roofing or siding system are non-coated granules that have a generally white color. These granules are distinguished from the granules disclosed in the two Harshberger references as set forth above.

Claim 84 also requires the non-coated granules to covering over about 95% of the top surface of the adhering surface of the roofing or siding system. This coverage percentage of the non-coated granules is also not disclosed in the two Harshberger references as set forth above.

Claim 84 further requires the non-coated granules have an average reflectivity of at least about 55-99.9%, an average hardness of over about 4 Moh's, an average opacity of at least about 60%, and an average porosity of about 0-15%. These physical property limitations of the non-coated granules are further not disclosed in the two Harshberger references as set forth above.

Claim 84 also requires that a majority of the non-coated granules consist of crushed porcelain wherein the crushed porcelain includes silicon dioxide and at least about 25 weight percent aluminum oxide and has a weight percent ratio of aluminum oxide to silicon dioxide of at least about 0.2:1. The two Harshberger references are absent any teachings concerning the use of white crushed porcelain as granules for use on the surface of a roofing or siding material. The Examiner acknowledges this deficiency of the two Harshberger references.

Applicants submit that the combination of McArdle with the two Harshberger references does not overcome the above stated deficiencies associated with the two Harshberger references. The Examiner asserted that McArdle teaches the use of crushed porcelain as a surface coating for a roofing material. McArdle is directed to an abrasive ceramic aggregate particle comprising a plurality of solid particles bonded together by a ceramic binding material. (Para. 6-7). The ceramic binding material coats the solid particles when forming the abrasive ceramic aggregate particle. (Para. 9 and Figs. 1, 2 & 6). McArdle discloses that the abrasive ceramic aggregate particle can be used in a number of applications, one of which includes roofing granules (Para. 10).

The non-coated granules defined in claim 84 is not a composite material. A majority if the

non-coated granules are crushed porcelain. As such, the granules defined in claim 84 are not coated or bonded particles as taught by McArdle. Furthermore, the composition of the composite material disclosed in McArdle is different from the crushed porcelain that forms a majority of the granules used in the roofing or siding system defined in claim 84. As such, McArdle does not disclose, teach or suggest the granules or the roofing or siding system defined in claim 84.

McArdle, like the two Harshberger references, is absent teachings relating to the average reflectivity, average hardness, opacity and average porosity of the granules used on a roofing or siding system. Consequently, McArdle in combination with the two Harshberger references does not make obvious the roofing or siding system defined in claim 84.

Applicants further submit that dependent claims 85-91 include limitations that are patentably distinct from the teachings of McArdle and the two Harshberger references for reasons that were set forth above.

Applicants submit that for at least the reasons set forth above, the above-identified patent application is in condition for allowance, and an early notice to that effect is earnestly solicited.

Respectfully submitted,
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